

REMARKS

The Pending Claims

The pending claims are directed to a system for polishing a substrate comprising a liquid carrier, ammonium oxalate, a hydroxy coupling agent, and a polishing pad and/or an abrasive. The pending claims are also directed to a method of polishing a substrate using the same. Claims 1-27 currently are pending.

Summary of the Office Action

The Office Action rejects claims 1-8, 13, 15, 16-18, 20, 22-24, and 26 under 35 U.S.C. § 103(a) as allegedly obvious over U.S. Patent 6,582,761 (Nishimoto et al.) (hereinafter “the Nishimoto ‘761 patent”) in further view of U.S. Patent 6,419,554 (Chopra et al.) (hereinafter “the Chopra ‘554 patent”). The Office Action also rejects claims 19, 21, 25, and 27 under 35 U.S.C. § 103(a) as allegedly obvious over the combination of the Nishimoto ‘761 and Chopra ‘554 patents in further view of U.S. Patent 6,503,766 (Ni) (hereinafter “the Ni ‘766 patent”). The Office Action objects to claims 9-12 and 14 as reciting allowable subject matter but depending from a rejected base claim.

Discussion of the Section 103 Rejections

The Office Action asserts that the Nishimoto ‘761 patent discloses an aqueous dispersion or a system for chemical-mechanical polishing comprising ion-exchanged water, ammonium persulfate, a silane coupling agent, a polishing pad, and a metal oxide abrasive. While the Office Action acknowledges that the Nishimoto ‘761 patent does not disclose or suggest a system comprising ammonium oxalate, the Office Action asserts that such a system would have been obvious to one of ordinary skill in the art in view of the Chopra ‘554 patent. Applicants traverse the obviousness rejections.

Contrary to the Office Action’s assertions, one of ordinary skill in the art, at the time of invention, would not have been motivated to combine the Nishimoto ‘761 and Chopra ‘554 patents in such a way as to arrive at the invention defined by the pending claims. The Nishimoto ‘761 patent discloses an aqueous dispersion of composite particles, which particles comprise an inorganic particle adhered to a polymer particle through a connecting compound (e.g., a silane coupling agent), useful as an abrasive in chemical-mechanical polishing (see, e.g., the Nishimoto ‘761 patent at col. 8, lines 3-30, and col. 17, lines 5-19). By way of contrast, the Chopra ‘554 patent is generally directed to non-abrasive planarizing solutions for use with fixed-abrasive polishing/planarizing pads (see, e.g., the Chopra ‘554 patent at col. 2, lines 36-40). While the Chopra ‘554 patent does provide that the disclosed planarizing

solution can comprise a buffering agent (e.g., ammonium oxalate), the Chopra '554 patent specifically distinguishes non-abrasive planarizing solutions from abrasive planarizing solutions and the method disclosed therein from those employing abrasive planarizing solutions. For example, the Chopra '554 patent states that "planarizing solutions developed for non-abrasive pad types are ill suited for use with fixed-abrasive pad types" (the Chopra '554 patent at col. 2, lines 20-23). The Chopra '554 patent further states that "integrated circuit devices produced in accordance with the invention are expected to exhibit physical characteristics different from the physical characteristics inherent in planarizing titanium nitride using non-abrasive planarizing pads in conjunction with abrasive slurry planarizing solutions" (the Chopra '554 patent at col. 8, lines 47-52).

Thus, rather than motivating one of ordinary skill in the art to modify the aqueous dispersion disclosed in the Nishimoto '761 patent in such a way as to arrive at the invention defined by the pending claims, the Chopra '554 patent specifically teaches that abrasive planarizing solutions or systems, such as the composite particle dispersion disclosed in the Nishimoto '761 patent, are fundamentally different from the planarizing solutions or systems used with fixed-abrasive polishing pads, such as the dispersion disclosed in the Chopra '554 patent. Therefore, contrary to the Office Action's assertions, one of ordinary skill in the art would not have been motivated to combine the teachings of the Nishimoto '761 patent and the Chopra '554 patent in such a way as to arrive at the invention defined by the pending claims. Indeed, the Chopra '554 patent suggests that one of ordinary skill in the art, having read the Nishimoto '761 patent, would not have even looked to art relating to non-abrasive planarizing solutions for potential modifications to the dispersion disclosed therein, or that one of ordinary skill in the art, having read the Chopra '554 patent, would not have even looked to art relating to abrasive solutions or dispersions for potential modifications to the planarizing solution disclosed therein. Moreover, even if one of ordinary skill in the art did look to the Chopra '554 patent, the aforementioned teachings would have discouraged the ordinary artisan from combining its disclosure with the Nishimoto '761 patent in any way, much less in such a way as to arrive at the invention defined by the pending claims. Accordingly, the Office Action fails to demonstrate that the pending claims are *prima facie* obvious over the Nishimoto '761 and Chopra '554 patents.

The Ni '766 patent does not cure the deficiencies of the Nishimoto '761 and Chopra '554 patents. The Ni '766 patent relates to a method and system for detecting an exposure of a material on a semiconductor wafer during chemical-mechanical polishing (see, e.g., the Ni '766 patent at the abstract). The Ni '766 patent does not, however, describe the chemical-mechanical polishing system to be employed in a polishing method or system according to

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the invention described therein. Therefore, the Ni '766 patent cannot properly be considered to supplement the teachings of the Nishimoto '761 and Chopra '554 patents in such a way as to motivate one of ordinary skill in the art to combine the cited references and arrive at the invention defined by the pending claims.

In view of the foregoing, the invention defined by the pending claims cannot properly be considered *prima facie* obvious over the cited references. In particular, one of ordinary skill in the art, at the time of invention, would not have been motivated to combine the references in such a way as to arrive at the invention defined by the pending claims. Indeed, the Chopra '554 patent specifically teaches away from any combination with references relating to abrasive-containing polishing systems or dispersions, such as that disclosed in the Nishimoto '761 patent. The Section 103 rejections, therefore, should be withdrawn.

Conclusion

The application is considered in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,



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